



PRODUCTION AND MARKETING OF TURMERIC IN ASSAM

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1. INTRODUCTION

With the launching of the new Economic policy, the emphasis of the government and the policy makers has tilted toward the commodities, which have market potential and could be exported to earn valuable foreign exchange. Amongst the various agriculture commodities which have market and export potential from India spices occupy a place of pride. Amongst Various spices turmeric is one of the most important crops and as a result India is the largest producer, consumer and exporter of turmeric in the world markets. It occupied an area of 16430 lakh hectares with total production of 375000 metric tonnes, accounting for nearly 60 Percent of the world turmeric production during the year 2015-16. Indian turmeric is considered to be the best in world because of its high curcumin content. The Important countries which import turmeric and turmeric products from Indian are U.S.A, U.K., UAE, Saudi Arabia, Kuwait, U.K, Netherland, Germany, France, Russia, Malaysia, Singapore, Japan, South Korea and middle-east countries.

In India turmeric is grown in almost all the states, but important turmeric growing states are: Andhra Pradesh, Orissa, Tamil nadu, Maharashtra, Bihar and Assam. In Assam Turmeric is almost cultivated in all district of the state, but highest cultivation of turmeric in term of area and production are Nagaon, Golaghat, Barpeta, Sonitpur, Lakimpur. The area and production of turmeric has increased substantially in the state over the years, indicating its immense development possibilities. Secondly, turmeric is an important spice crop of the state and is grown as cash crop for market. In the new economic environment the remarkable achievement is that the agricultural economy has substantially changed from subsistence to market oriented economy and is truer for the crops which have an export potential like turmeric. Keeping in view the importance of production and marketing of this crop for the state the study was undertaken with the following objectives:-

- To study the growth of area, production and productivity of turmeric.
- To study the marketable surplus and marketed surplus of turmeric and factors affecting them.
- To study the price-spread and marketing efficiency in marketing of turmeric in the project area.
- To highlight the major problems of marketing turmeric in the projected area.

1.1 METHODOLOGY

To estimate the growth rates of area, production and productivity of turmeric, the secondary data on average production and productivity of the crop were obtained from the Directorate of statistics and Evaluation, Govt. of Assam for the period from 2001-02 to 2015-16 for district Nagaon as well as for the state of Assam.

District Nagaon where the production of turmeric was highest in Assam during the year 2014-05 was selected purposively for the study. A sample of 30 farmers comprising of small, medium and large categories of farm were selected randomly from a cluster of three villages having substantial area under turmeric cultivation. In addition 20 village trader, 20 wholesalers, 20 retailers and 20 consumers were selected randomly from the selected villages and the Nagaon wholesale agriculture produce market.

1.2 ANALYTICAL PROCEDURE

(I) **Compound Growth Rate:** The compound growth rates of area, production and productivity of turmeric during the period 2000-01 to 2014-15 were worked out by fitting exponential function of the type:-

$$Y_t = Ab^t$$

Where,

$$Y_t = \text{Area/production/productivity of turmeric in year } t$$

$$A = \text{intercept}$$

t = different years

$$B = 1 + \frac{1}{100}$$

(ii) **Marketable surplus:** Marketable surplus is the actual quantity of a commodity that is available with the farmer after meeting his seed requirements. Family requirements, kind payments as wage and payments to other to whom he pays for their services. Marketable surplus of selected turmeric is estimated by adopting the following formula (sashimatsung.2014)

$$MS = P - C$$

Where,

$$MS = \text{Marketable surplus}$$

$$P = \text{Total production}$$

$$C = \text{Total requirement (seed requirement, self consumption, gift and Payment in kind)}$$

(iii) **Marketed surplus:** It is the quantity of a commodity which a farmer actually sells in the markets. Marketed surplus is estimated as follows-

$$Md, S = MS - \text{Post harvest losses (at farm)}$$

Where,

$$Md, S = \text{Marketed surplus}$$

$$MS = \text{Marketable surplus}$$

(iv) **Multiple Linear regressions:** In order to analyze various factors influencing marketed surplus of vegetables multiples Linear Regression Model has been employed. In order to run the OLS regression the normality of the data sets are being tested by calculating the ratio of skewness to standard error of skewness and the ratio of Skewness to Standard error of Skewness and the ratio of Kurtosis to standard error of Kurtosis. Since the original data sets are found to be not normal therefore they are converted to normal form through logarithmic transformation.

(v) **Marketing cost:** Marketing cost is important to ascertain the relative share of the producers in consumer's rupee. Its mainly includes transportation cost, labor, packaging cost, market fee, spoilage cost and plucking charges etc, marketing cost worked out by using the following formula-(Baruah et.al, 2001)

$$T_c = C_p + \sum M_{ci}$$

Where,

$$T_c = \text{Total cost of marketing}$$

$$C_p = \text{Cost incurred by the producer in marketing of his produce}$$

$$M_{ci} = \text{Marketing cost incurred by the } i^{\text{th}} \text{ middleman.}$$

(vi) **Marketing margin:** Marketing margin refers to the difference between the price received by the producers and that of paid by the consumers. Marketing margin is calculated by using the following formula-(Baruah et.al, 2001)

$$A_m = \text{Absolute margin of the middleman or the traders}$$

$$P_m = \text{Selling price of the traders}$$

$$P_b = \text{Buying price of the traders}$$

$$M_c = \text{marketing cost of the traders}$$

The producer's share in consumer's rupee is worked out by using this -

$$P_o = (P_p / P_r) \times 100$$

Where,

$$P_o = \text{producer's share in consumer's rupee}$$

$$P_r = \text{price paid by the consumers or sale price of the retailers.}$$

P_p = producer's price for their produce.

(vii) **Marketing efficiency:** The marketing efficiency of identified channels of turmeric marketing was estimated by using Shepherd formula as mentioned below:

$$ME = \frac{V}{I} - 1$$

Where,

ME = Index of marketing efficiency

V = Value of goods sold (consumer's price)

I = Total marketing cost.

(viii) **Problems of marketing:** Garrett's ranking technique: To analyze the problems encountered by the growers of turmeric Garrett's ranking technique is

used. The respondents are asked to rank the different factors which created problems in marketing of turmeric. In order of merit given by the respondents are converted into ranks by using the following formula-

$$\text{Percent position} = 100(R_{ij} - 0.5) / N_j$$

Where,

R_{ij} = rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

The percent position of each rank thus obtained is converted into scores by referring to the tables given by Garrett and Woodworth (1969). Then for each factor the score of individual respondent are added together and divided by the total numbers of respondents for whom the score are added. The main score thus obtained for all the factors are then organized in descending order, ranks given and the most limiting factor identified.

Table 1. Compound Growth Rate of Area, Production and Productivity of Turmeric in Assam and District Nagaon Over Periods

(Area in Hectare, Production in Tons)

Time Period	Assam			Nagaon		
	Area	production	Productivity	Area	production	productivity
2001-02 To 2005-06	-0.17	-1.94	-1.33	0.41	1.33	0.15
2006-07 To 2010-11	1.47	2.45	0.83	1.01	1.67	0.54
2011-12 To 2015-16	0.54	1.19	1.17	0.53	1.45	0.57

Sources: Directorate of Statistics and Evaluation, Govt. of Assam.

To work out and compare the growth rate of area, production and productivity of turmeric in the state and district Nagaon, the total period has been divided into three sub periods each of four years duration as presented in table-1.

It is observed from the table that during the fifteen years periods from 2001-02 to 2015-16 the growth rates of area, production and productivity of turmeric in the state of Assam as well as district Nagaon are positive and significant indicating scope for its further development in future.

1.3 ESTIMATION OF MARKETABLE AND MARKETED SURPLUS OF TURMERIC

The need for precise assessment of marketed and marketable surplus is important in the context of development not only for agriculture sector but also for overall economic development. Understanding the magnitude of marketable and marketed surplus and factor affecting it can be great important in the development of sound policies with respect to marketing, pricing and distribution of spices. The marketing practices of the farmer are determined mainly on the basis of surplus available with them after meeting own-requirement. The market structure and behavior on the other hand determines the incentive for the farmers to sell their surplus.

Table- 2. shows the per farm marketable and marketed surplus of turmeric with

the related factors affecting marketed surplus viz. area under the crop, production of the crop, non market transaction and post harvest losses in the study area according to different categories of operational holdings.

In the study area per hectare marketed surplus for large farmer is 49.78 quintals and for medium and small is 36.07 and 29.16 quintals respectively. A positive relation is observed from the table (2) between farm size and marketed surplus of turmeric as the same is increasing with increase in farm size. Per hectare marketed surplus is worked out to be 38.33 for all the three categories of farm which is 83.39 percent of per hectare production. Per hectare marketable surplus varies from 51.07 quintals in large farms to 39.78 quintals in small farms. Per hectare family consumption is found to be lowest in medium size group of farms i.e. 3.47 quintals and highest in small farms i.e. 4.56 quintal which indicates smaller the size of farm higher is the production for meeting the domestic requirements. Post-harvest losses of turmeric are found to be highest in small category of farm (1.93 quintal/hectare) and lowest in large farm (1.29 quintal/hectare). It may be due to the reason that larger farms use more protective measures to minimize the post-harvest losses of the produce. However, the marketable surplus of turmeric in the study area is found to be higher than marketed surplus for all the farms. This is mainly due to the presence of wastage of turmeric during the process of marketing.

Table. 2.
Marketable and marketed surplus of turmeric by farm size

(Quintal / hec.)

Sl. No	Operational Holding	Production	Family Consumption	Gift & kind payments	Marketable surplus	Post Harvest Loss	Storage	Marketed Surplus
1	Large	57.45	3.59 (6.24)	2.79 (4.85)	51.07 (88.89)	1.29 (2.24)	-	49.78 (86.64)
2	Medium	42.89	3.47 (8.09)	2.23 (5.19)	37.19 (86.71)	1.12 (4.94)	-	36.07 (84.09)
3	Small	37.56	4.56 (12.14)	1.91 (5.08)	31.09 (82.7)	1.93 (2.9)	-	29.16 (77.63)
4	All farms	45.96	3.87 (8.42)	2.31 (5.02)	39.78 (86.55)	1.44 (4.17)	-	38.33 (83.39)

(Figure in the parentheses indicate percentage)

1.4 FACTORS AFFECTING MARKETED SURPLUS OF TURMERIC.

In the light of the finding of the field survey on production and marketing of turmeric in Nagaon district of Assam and on the preliminary examination of the data collected a few variables are considered to examine their affects on marketed surplus of turmeric.

The factor that are likely to influence the marketed surplus of the turmeric are identified as area under the production, total production, family consumption, non market transaction and post harvest losses. To study the impact of each factor on marketed surplus multiple linear regression analysis is carried out.

In order to examine the affects of above mentioned factors on marketed surplus the following multiple linear regression model is used:

$$Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + v$$

Where,

Y = Marketed surplus of turmeric

B_0 = Constant

B_1, B_2, B_3, B_4 & B_5 = co efficient

v = random disturbance term

X_1 = Area under the crop

X_2 = Total production of the crop

X_3 = Family consumption

X_4 = Non market transaction (kind payments and gifts)

X_5 = Post harvest losses

Table3. Description of the Explanatory Variables

Sl. No	Variables	Definition	Value
1	Area	Area under the vegetables	In Hectare
2	Production	Production of the vegetables	In quintal
3	Family consumption	Family consumption	In quintal
4	Non market transaction	Kind & gift payments	In quintal
5	Post-harvest losses	Post-harvest losses of vegetables	In quintal

Table No. 4 Regression Result

Sl. No	Variables	Estimated Co-efficient	t-scores	VIF
1	Constant	.039	1.133	-
2	Area under turmeric	.436	6.802*	1.691
3	Total production of turmeric	.928	24.283*	2.695
4	Family consumption	-.031	-1.078	1.045
5	Non market transaction	-.153	-2.369**	2.184
6	Post- harvest losses	-.151	-2.632**	2.532

Here, $R^2 = .881$ $F = 310.80$

*indicates 1% level of significance

** indicates 5% level of Significance.

Regression Result:

Table No. 4. Shows the results of multiple regressions for turmeric in the study area. The result indicates a positive relation of area and production of turmeric with its marketed surplus. The regression co-efficient of area under crop and total production are found highly significant at 1 percent probability level in the study area. This signified that these two factors played important role in determining the marketed surplus of turmeric. However family consumption of turmeric is found to be insignificant, and has the negative effect on marketed surplus of turmeric. In our study, non market transaction of turmeric and post harvest losses of turmeric are also found to be negative related with marketed surplus and they are statistically significant at 5 percent probability level respectively.

1.5 MARKETING

There are three important channels through which turmeric produced in the project area passes from original producer to the ultimate consumer. The identified channels are:

- I. Producer – Village trader- Wholesaler – Retailer – Consumer
- II. Producer – Wholesaler- Retailer – Consumer
- III. Producer- Retailer-Consumer

The proportion of turmeric marketed through different channels on different size group of farm is presented in Table. No 5.

Table. No.5. Disposal of turmeric through identified marketing channels

Categories of Farm	Channels of Marketing		
	I	II	III
Large	23	61.45	15.55
Medium	55.56	35.44	9
Small	88.54	6.78	4.68
All Farm	55.7	34.5	9.7

Sources: Field survey

It is observed from the Table that in an average taking all size group of farms together, 55.7 percent is marketed through village traders (channel-I) and the remaining 34.5 and 9.7 percent is marketed through wholesalers (channel-II) and retailers (channel-III), respectively. A farm size group wise analysis indicates that majority of the large farmer (61.45 percent) preferred to carry the produce directly to the wholesalers of Nagaon market (channel-II) because of their better resources base and could fetch higher price for their produce. On the other hand most of the farmers belonging to medium (55.56 percent) and small (88.54 percent), market their produce through village trader at a lower price (channel-I), mainly because of marketable surplus. Marketing of turmeric directly through retailer is observed to be very small on all categories of farmers.

1.6 PRICE –SPREAD

The price – spread in turmeric marketing comprising of price received by producer, cost of marketing, margin of profit of intermediaries, price paid by consumer as well channel wise marketing efficiency is presented in Table No.6.

Table-No 6 . Price Spread and Marketing Efficiency

(Rs./ Quintal)

Sl. No	Particular	Channels		
		I	II	III
1	Price received by producer	2400.00 (60)	2800.00 (70)	2650.50 (66.26)
2	Marketing cost	351.00 (8.7)	331 (8.27)	351.00 (8.7)
3	Marketing margins	1252 (31.3)	869.2 (21.73)	1001 (25.04)
4	Price –paid by consumer (Nagaon Market)	4000.00 (100)	4000.00 (100)	4000.00 (100)
5	Market Efficiency	1.5	2.33	1.95

Sources: Field survey

It is observed from the table that the producer's share in consumer's rupee varies from 60 to 70 percent. Comparatively higher producer's share in channel-II is mainly due to the fact that the turmeric growers himself perform the post harvest operation and carries the produce directly to the wholesalers in wholesale market of Nagaon and fetches higher return for his produce. The index of marketing efficiency (2.33) also indicate that marketing of turmeric by turmeric growers directly through wholesalers (channel-II) is comparatively more efficient than other identified channels. The analysis also depicts that through the sale of turmeric through village traders (channel-I) is the least efficient, even through largest proportion of the produce is marketed through this channel to the disadvantage of the turmeric grower.

1.7 CONSTRAINTS IN MARKETING TURMERIC

The constraint faced by the sample farmers in Marketing of their produce in the study area were studied and problems are presented in descending order of their relative importance in Table No.7. With the help of Garrett's ranking technique.

Table. No.7. Problems of Marketing Turmeric in Nagaon District

Sl. No	Problems	Mean Score	Rank
1	Price uncertainty	69.82	I
2	Lack of storage facilities	68.16	II
3	High marketing cost	58.27	III
4	Lack of suitable Govt. policy	54.08	IV
5	Lack of processing unit.	43.75	V
6	Lack of transport facilities	42.86	VI
7	Lack of marketing information	33.19	VII

Sources: Field survey

It is observed from the table No.7. that the main problems identified by the sample farmers are price uncertainty, lack of storage facilities, High marketing cost, lack of suitable Govt. policy, lack of processing unit, lack of transport facilities and lack of marketing information. Among the identified problems, Price uncertainty rank first and lack of marketing information rank last i.e. V.

1.8 CONCLUSION

It is evidence from the study that the area, production and productivity of turmeric in the state of Assam is increasing and the state is likely to become a surplus state with respect to turmeric production by the end of the century. The study indicates immense scope of export and also evident that the improved technology of turmeric production needs to be extended in a big way to the farmers in order to increase the production level of turmeric in the state through increased level of productivity.

The marketing scenario indicates that turmeric marketing is not properly organized and turmeric growers need to be encouraged for group or co-operative marketing. Even in the existing system the turmeric growers fetch better price for their produce by selling it directly through the wholesaler.

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